

Assessment of associated factors with nocturia in young and older urinary incontinent

Üriner inkontinansı olan genç ve yaşlı kadınlarda noktüri ile ilişkili faktörlerin değerlendirilmesi

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Özet

Amaç: Üriner inkontinanslı (Üİ) genç ve yaşlı kadınlarda noktüriyi etkileyen faktörleri değerlendirmek.

Gereç ve Yöntemler: Kasım 2021-Mart 2022 tarihleri arasında Üİ şikâyeti ile üroloji polikliniğine başvuran kadınlar çalışmaya dahil edildi. Demografik veriler, antropometrik ölçümler, ilaçlar ve komorbiditeler kaydedildi. Yaşam kalitelerini değerlendirmek için ICIQ-SF testi uygulandı. Geceleri ≥ 2 idrar yapma ihtiyacı ile uyanan hastalarda noktüri var olarak kabul edildi.

Bulgular: Çalışmaya 92 kadın dahil edildi. Hastalar <60 yaş ($n=47$) ve ≥ 60 yaş ($n=45$) olarak 2 gruba ayrıldı. Bel çevresi ve vücut kitle indeksi ≥ 60 yaş hastalarda daha yüksekti (sırasıyla; $p= <0,001$, $p= 0,034$). Kullanılan ilaç sayısı yaşlı grupta daha fazlaydı ($p= <0,001$). Diüretik ve antikolinergik ilaç kullanımı yaşlı grupta genç gruba göre daha yüksekti (sırasıyla; $p= <0,001$, $p= 0,006$). Tip 2 Diabetes Mellitus'lu (DM) hasta sayısı ve komorbidite sayısı yaşlı grupta daha fazlaydı (sırasıyla; $p= 0,002$, $p= 0,025$). Noktürisi olan ve olmayan genç grupta antropometrik ölçümler, kullanılan ilaçlar ve komorbiditeler açısından fark bulunmadı. Noktürisi olan yaşlı grupta ilaç sayısı ve Tip 2 DM olan hasta sayısı noktürisi olmayan yaşlı gruba göre anlamlı olarak daha yüksekti (sırasıyla; $p= 0,04$, $p= 0,036$).

Sonuç: Tip 2 DM ve çoklu ilaç kullanımı, Üİ'li yaşlı kadınlarda noktüri için risk faktörleridir. Bu risk faktörlerinin değerlendirilmesi ve yönetimi daha iyi klinik sonuçlara katkıda bulunabilir.

Anahtar Kelimeler: yaşlı, noktüri, risk faktörleri, üriner inkontinans, kadın

Abstract

Objective: To assess the factors affecting nocturia in young and older women with urinary incontinence (UI).

Material and Methods: Women who applied to the urology outpatient clinic with the UI complaint between November 2021-March 2022 were included. Demographic data, anthropometric measurements, medications and comorbidities were recorded. The ICIQ-SF test was applied to evaluate their quality of life. Patients who have been waking up at night with the need to urinate ≥ 2 were considered to have nocturia.

Results: Ninety-two women were included. Two groups were created as patients <60 years ($n=47$) and ≥ 60 years ($n=45$). The body mass index and waist circumference were higher in patients ≥ 60 years (respectively; $p= 0.034$, $p= <0.001$). Using of diuretic and anticholinergic medications was higher than in the younger group (respectively; $p= <0.001$, $p= 0.006$). The total number of medications was higher in the older group ($p= <0.001$). The number of comorbidities and the number of patients with Type 2 Diabetes Mellitus (DM) were higher in the older group (respectively; $p= 0.002$, $p= 0.025$). No difference was found in the young group with and without nocturia in terms of anthropometric measurements, medications used, and comorbidities. The number of medications and the number of Type 2 DM patients were significantly higher in the older group with nocturia (respectively; $p= 0.04$, $p= 0.036$).

Conclusion: Type 2 DM and multiple medication use are risk factors for nocturia in older women with UI. Evaluation and management of these risk factors may contribute to better clinical outcomes.

Keywords: aged, nocturia, risk factors, urinary incontinence, women

The study was approved by Ethical Committee of Istanbul Medipol University (Approval No: 1051, Date: 26 November, 2021).

All research was performed in accordance with relevant guidelines/regulations, and informed consent was obtained from all participants.

INTRODUCTION

Nocturia is defined as one or more awakenings during the night to urinate by the International Continence Society (ICS) (1). Although defined as a symptom rather than a disease, 2 or more urinations per night is considered clinically significant due to the negative effect of nocturia on well-being and health-related quality of life (2). The prevalence of nocturia increases with aging and almost 50 percent of adults ages 50 to 79 have nocturia (3). Also, 60-80% of nocturia cases occur in older adult population (4). A recent study from the National Health and Nutrition Examination Survey showed that 45% of women and 51.5% of men aged 60 and older wake up at least twice each night to urinate (5). While symptoms rarely occur between the ages of 50 and 59, between the ages of 70 and 79, symptoms occur at least twice a night (6).

There are three known mechanisms for the occurrence of nocturia. These are decreased bladder volume, increased urinary output at night, and sleep-related disorders (7). The other related conditions are urgency, benign prostatic hyperplasia and/or bladder outlet obstruction, urinary tract infections, and low bladder capacity (8, 9). Nocturnal polyuria, peripheral edema (without heart failure), congestive heart failure, poor control of diabetes mellitus (DM), excessive fluid intake throughout the day or large fluid intake prior to bedtime, and intake of diuretic substances are caused nocturia with increased urine output at night (10). Sleep apnea, difficulty in sleep maintaining, restless legs syndrome or periodic limb movements are sleep disorders known to cause nocturia (11, 12).

Nocturia, which is more common in older people, is a known risk factor for falls, fractures, and depression (9,13). Nocturia may cause sleep disturbances. It is also related with dependence, obesity, DM, and heart disease (8, 14). Besides, nocturia is an independent risk factor for mortality (15).

Urinary incontinence (UI) is a geriatric syndrome whose frequency increases with aging and is more common in women (16). Since UI is a risk factor for nocturia, the presence of additional risk factors may increase the prevalence of nocturia. Knowing the factors affecting nocturia in women with UI is important

in order to prevent the development of possible complications by managing nocturia correctly. Therefore, we aimed to assesment of the factors affecting nocturia in young and older women with UI.

MATERIAL AND METHODS

Study Population

A cross-sectional study has been proposed. The local ethics committee approval was obtained for the study (1051, 26.10.2021). Between November 2021 and March 2022, women who applied to the urology outpatient clinics with the complaint of UI and had stress, urge, and mixed UI as a result of the anamnesis and physical examination evaluation were included in the single-center study. The reason for including only patients with UI in the study is to homogenize the patient groups in terms of this risk factor. The patients included in the study were those who had not had an incontinence operation before and were not taking medical treatment for UI at the time of admission. All of these patients underwent complete urinalysis and urine culture, and as a result of these tests, patients with urinary tract infections were excluded from the study. Two groups have been created as under 60 years old and 60 years old and over patients. Patients who had cognitive dysfunction (severe dementia, persistent cognitive dysfunction due to a past cerebrovascular event, delirium) and could not reply to our questions and the International Consultation on Incontinence Questionnaire- Short Form (ICIQ-SF) were excluded from the study. All patients gave informed consent (written and verbal).

Data Collection

Demographic data, comorbidities, medication history, number of vaginal deliveries, anthropometric measurements [height (cm), weight (kg), waist circumference (cm), body mass index (BMI) (kg/m²)] of the patients were recorded. The ICIQ-SF was administered to all patients to appraise the effect of UI on quality of life (17). Patients who woke up with the need to urinate at 2 or more nights were considered to have nocturia.

Statistical Analysis

The SPSS (Statistical Package for Social Sciences (v21.0, IBM, Chicago, IL, US)) has been used for data

analysis. The statistical power of the study was determined with the G*Power software (version 3.1). For analyzing the association between the age groups with patients' demographic-clinical data has been used by Mann-Whitney U and chi-square tests. Also, the relationship between nocturia and patients' demographic and clinical data was conducted by the Mann-Whitney U and chi-square tests in both age groups. A p-value less than 0.05 has been accepted considered statistically significant.

RESULTS

Ninety-two patients with UI complaints constituted the study population. Two groups were created according to age, under 60 years old (n=47) and 60 years old and over (n=45). When the patient groups aged <60 years and ≥60 years were compared, it was found that the BMI and waist circumference of the patients aged ≥60 years were significantly higher than those of the young (respectively; p=0.034 p= <0.001) (Table 1). Again, the mean number of medications used by the older group was higher more than the younger group, significantly, (p= <0.001). Diuretic and anticholinergic use was higher in the older group than in the younger group (respectively; p= <0.001 p=0.006). The number

of comorbidities was higher in patients aged >60 years (p=0.002). The number of patients with type 2 DM was also higher in the older group (p=0.025). The number of vaginal deliveries was 4±2 (mean±S.D) in the ≥60 age group and 2±1.50 (mean±S.D) in the <60 age group, and this difference was statistically significant (p= <0.001) (Table 1). Nocturia was present in 63% of all patients, 55.30% of patients aged <60 years and 71.10% of patients aged ≥60 years, but this difference was not statistically significant (Table 1).

In the comparison between patients with (n= 26) and without nocturia (n= 21) in order to evaluate the factors affecting nocturia in the patient group under 60 years of age, no significant difference was found in terms of demographic and clinical data (Table 2).

There were 32 patients with nocturia and 23 patients without nocturia in the 60 years and older group. The mean number of medications used by patients with nocturia was significantly higher than that of patients without nocturia in the older group (p= 0.04). Also, the number of patients with Type 2 DM in the older group with nocturia (n= 15, 49.20%) was significantly higher than the number of patients with Type 2 DM in those without nocturia (n= 2, 15.40%) (p= 0.036) (Table 3).

Table 1. Demographic and clinical data of the participants.

	<60 age (n=47)	≥ 60 age (n=45)	Total (n=92)	p value
Age (mean±S.D)	48.7±8.5	70.2±7	59.2±13.3	<0.001
Height (m) (mean±S.D)	1.6±0.3	1.4±0.1	1.5±0.1	0.005
Weight (kg) (mean±S.D)	75.1±12.7	77.2±13.8	76.1±13.2	0.574
Waist circumference (cm) (mean±S.D)	96.6±11.2	106.9±13.2	101.6±13.2	<0.001
BMI (kg/m ²) (mean±S.D)	29.9±5.2	32±5.1	31±5.2	0.034
Number of medications (median, 25-75)	1.6 (1.2-2.2)	4 (3-5)	2.8 (2.2-3.4)	<0.001
Number of diuretic use (n, %)	4 (8.5 %)	18 (40 %)	22 (23.9 %)	<0.001
Number of anticholinergic (n, %)	1 (2.1 %)	9 (20 %)	10 (10.9 %)	0.006
Number of comorbidities (median, 25-75)	1.5 (1.1-1.9)	2.4 (2-2.9)	1.95 (1.6-2.3)	0.002
Type 2 DM (n, %)	8 (17 %)	17 (37.8 %)	25 (27.2 %)	0.025
Chronic Kidney Disease (n, %)	0 (0 %)	1 (2.2 %)	1 (1.1 %)	0.304
Number of vaginal delivery (mean±S.D)	2±1.5	4±2	3±2	<0.001
ICIQSF (mean±S.D)	14.7±3.6	13.2±4.1	13.9±3.9	0.055
Nocturia (n, %)	26 (55.3 %)	32 (71.1 %)	58 (63 %)	0.117

*p value is significant is under 0.05; **BMI**: body mass index; **DM**: diabetes mellitus;

ICIQ-SF: The International Consultation on Incontinence Questionnaire-Short Form; **S.D**: Standard Deviation.

Table 2. Comparison of patients aged <60 years with and without nocturia in terms of demographic and clinical data.

	Nocturia (n=26)	None nocturia (n=21)	p value
Age (mean±S.D)	47.9±8.9	49.6±8.3	0.421
Height (m) (mean±S.D)	1.5±0.1	1.6±0.1	0.797
Weight (kg) (mean±S.D)	75.6±14.2	74.4±11	0.830
Waist circumference (cm) (mean±S.D)	96.4±12.4	96.9±9.7	0.570
BMI (kg/m ²) (mean±S.D)	30.1±6	29.7±4.1	0.949
Number of medications (median, 25-75)	1.7 (1-2.2)	2 (1.4-2.6)	0.974
Number of diuretic use (n, %)	2 (7.7 %)	2 (9.5 %)	0.823
Number of anticholinergic (n, %)	0 (0 %)	1 (3.8 %)	0.364
Number of comorbidities (median, 25-75)	1.4 (0.8-2.1)	1.6 (0.9-2.3)	0.666
Type 2 DM (n, %)	4 (15.4 %)	4 (19 %)	0.740
Chronic Kidney Disease (n, %)	0 (0 %)	0 (0 %)	
Number of vaginal delivery (mean±S.D)	2±1.6	2±1.4	0.982
ICIQSF (mean±S.D)	14.7±3.8	14.7±3.5	0.897

*p value is significant is under 0.05; **BMI**: body mass index; **DM**: diabetes mellitus;

ICIQ-SF: The International Consultation on Incontinence Questionnaire-Short Form; **S.D**: Standard Deviation.

Table 3. Comparison of patients aged ≥ 60 years with and without nocturia in terms of demographic and clinical data.

	Nocturia (n= 32)	None nocturia (n= 23)	p value
Age (mean±S.D)	71.4±7.1	67.2±5.9	0.052
Height (m) (mean±S.D)	1.55±0.04	1.56±0.04	0.870
Weight (kg) (mean±S.D)	78±14.6	75±11.6	0.625
Waist circumference (cm) (mean±S.D)	108.3±14	103.2±10.7	0.287
BMI (kg/m ²) (mean±S.D)	32.5±5.3	31±4.6	0.249
Number of medications (median, 25-75)	4.5 (3.5-5.6)	3 (1-5.5)	0.04
Number of diuretic use (n, %)	12 (37.5 %)	6 (46.2 %)	0.591
Number of anticholinergic (n, %)	8 (25 %)	1 (7.7 %)	0.188
Number of comorbidities (median, 25-75)	2.7 (2.2-3.1)	1.9 (1-2.9)	0.092
Type 2 DM (n, %)	15 (49.2 %)	2 (15.4 %)	0.036
Chronic Kidney Disease (n, %)	0 (0 %)	1 (7.7 %)	0.113
Number of vaginal delivery (mean±S.D)	4.1±2.1	3.6±2.1	0.420
ICIQSF (mean±S.D)	13.8±3.5	11.6±5.2	0.195

*p value is significant is under 0.05; **BMI**: body mass index; **DM**: diabetes mellitus;

ICIQ-SF: The International Consultation on Incontinence Questionnaire-Short Form; **S.D**: Standard Deviation.

DISCUSSION

Approximately half of patients with daytime urinary urgency are also known to have clinically significant nocturia (8). Therefore, to prevent further increased risk of nocturia, which is already high in patients with UI, we evaluated other factors influencing the occurrence of nocturia in women with UI. In our study, in which we assessed the factors affecting nocturia in young and older women patients with UI, we found that Type 2 DM and the high number of medications are risk factors for nocturia in older patients with UI.

There are many known risk factors for nocturia (18). Aging is one of the most important risk factors for nocturia. Studies in the literature support that the incidence of nocturia increases with age (19). In our study, the incidence of nocturia was higher in the older group than in the younger group. However, this difference was not statistically significant. This may be related with the low number of patients in the groups. Recognition and management of nocturia-associated factors are important, especially in older adults, as nocturia causes geriatric syndromes such as falls, hip fractures, immobility and weakness, lower sleep quality, increased fatigue, and depression. (18, 20- 22).

Caffeine, alcohol, anticholinergics, cholinesterase inhibitors, beta-blockers, diuretics, and with diuretic effects such as lithium are medications known to affect patients' nocturia (8). The reason for this may be that some medications with a high anticholinergic drug burden, such as antidepressants, and antipsychotics cause detrusor overactivation. Another reason may be drug interactions and adverse drug reactions, which increase as the number of medications taken increases. No relationship has been found between diuretic and anticholinergic use and nocturia in both age groups, while the high number of medications used in older patients was found to be associated with nocturia, in this study. In a recent study in the literature investigating the association between nocturia and comprehensive geriatric assessment parameters in older men, a positive correlation was found between the number of medications used and the frequency of nocturia (23). Also, in a study conducted in older women, a signif-

icant relationship was found between polypharmacy and nocturia, regardless of the type of medication used similar to our study (24). Both polypharmacy and UI are risk factors for nocturia. The combination of the two conditions may increase the risk of nocturia. In our study, it was found that the number of medications used in older women with UI was a risk factor for nocturia, but this association was not found in the younger group. Since the significantly lower number of medications used in the younger group check against the older group, increased medication interactions in older adults, and adverse medication reactions that occur as the number of medications increases may be related to this situation.

With the increase in aging, changes in lifestyle, increasing obesity rates, the incidence of Type 2 DM is also increasing. DM is one of the independent risk factors for UI in women. A study conducted in Turkey found that the prevalence of UI increased significantly in diabetic women (24). DM is also a known risk factor for nocturia (8). Diabetic neuropathy, osmotic diuresis due to glucosuria, and polydipsia due to dry mouth are the pathophysiologies thought to cause this condition (25). In a study investigating the risk factors for nocturia in both genders, DM was associated with nocturia in women but was not associated in men (26). Besides, in a study comparing young and old female patients, similar to our study, it was found that nocturia was more common in older women with diabetes than in younger women with diabetes (27). The fact that DM is a risk factor for both UI and nocturia suggests that the risk of developing nocturia may be increased in women with UI who have Type 2 DM. In our study, Type 2 DM was found to be a risk factor for nocturia in older women with UI. The reason that this result was not found in the young group may be due to the significantly lower incidence of Type 2 DM in young patients compared to the older group.

It is known that the prevalence of nocturia is high in chronic kidney disease (CKD) patients and its severity is related to the stage of the disease (28). However, this relationship could not be found because the number of patients with CKD was very small in our study.

The strength of our study is that, according to our

knowledge, it is the first study to assess the risk factors affecting nocturia in young and older women with UI. Our study has some limitations. The first limitation is the absence of a control group without UI. The second limitation is the small number of patients in the groups. Our study needs to be supported by studies with a higher patient numbers, including the control group without UI.

CONCLUSION

The basic approach in incontinence patients with nocturia is based on the underlying cause. In our study, Type 2 DM and the number of medications used are risk factors for nocturia in the older group. More effective clinical results may be obtained with a multidisciplinary approach by questioning the presence of Type 2 DM and multiple medication use in this patient group in more detail, or by examining the presence of nocturia in patients with these risk factors.

Conflict of Interest

The authors declare to have no conflicts of interest.

Financial Disclosure

The authors declared that this study has received no financial support.

Informed Consent

Informed consent was obtained from all individual participants included in the study.

Ethical Approval

The study was approved by Ethical Committee of İstanbul Medipol University (Approval Number: 1051, 26.10.2021) and written informed consent was received from all participants. The study protocol conformed to the ethical guidelines of the Helsinki Declaration.

Author Contributions

Conception and design; MS, RBS, Data acquisition; MS, RBS, Data analysis and interpretation; MS, RBS, Drafting the manuscript; MS, RBS, Critical revision of the manuscript for scientific and factual content; MS, RBS, Statistical analysis; MS, RBS, Supervision; MS, RBS.

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